



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,610	11/12/2003	Petra Specht	UCB-3/CIP(B99-025-3)	5874
7265	7590	04/01/2005	EXAMINER	
MICHAELSON AND WALLACE PARKWAY 109 OFFICE CENTER 328 NEWMAN SPRINGS RD P O BOX 8489 RED BANK, NJ 07701			PERT, EVAN T	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 04/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/706,610

Applicant(s)

SPECHT ET AL.

Examiner

Evan Pert

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1103</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. Fig. 1 is non-compliant with 37 CFR 1.84(p)(3), which requires lettering and numbering in submitted patent drawings to measure minimum 1/8 inch in height.

Specification

2. Pages 42 through 129 of the specification consist of "Attachment A (COLOR Version)," which is presented as a black and white printout of a slide presentation of figures and tables not in compliance with 37 CFR 1.58. That is, the specification, as filed, is not in suitable form for printing as a quality patent.

Correction by substitute specification is required. See 37 CFR 1.77.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

"the uncharged antisite defect"

Independent claims 1, 6, 11 (and hence their depending claims) recite the limitation "the uncharged antisite defect" in last lines, yet there is insufficient antecedent basis for this limitation in the claims.

For purposes of examination, the acceptor "Be" meets the limitation: "wherein the acceptor has an electronic energy level below the midgap energy level of the uncharged antisite defect," consistent with claim 4, for example.

"balanced"

The term "balanced" in claim 16 is a relative term, which renders the claim indefinite (and hence the claims 17-21 depending from claim 16).

The term "balanced" is open-ended in claim 16, because "balanced" is supposed to be claimed relative to "antisites," but "antisites" are omitted from claim 16. That is, the specification indicates that a "balanced" concentration of acceptor dopant (i.e. balanced with respect to antisite concentration) is defined to include: "a concentration up to (but not exceeding) the concentration of antisites" [p. 15, lines 22-24].

For purposes of examination, "balanced concentration," in claim 16, means "concentration up to (but not exceeding) a concentration of antisites," per p. 15, lines 22-24 of the specification.

Product-by-Process

In claim 21, applicant claims a "semiconductor material" in a product-by-process format [MPEP 2113], with the added limitation that the material is "thermally stable." Yet, the process defining the product (claim 16) is ill-defined, such that a Be-doped LT-GaAs with any concentration of Be dopant must be considered "thermally stable" to some degree, or it couldn't exist at room temperature, for example. One of ordinary skill in the art would not be able to understand the scope of the structure of claim 21 because the scope of the process-defining claim is ill defined.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by *any* of:

1) Lutz et al. ("Thermal Stabilization of Non-Stoichiometric GaAs through Beryllium Doping"), 2) Maltez et al. ("Structural and Photoluminescence Analysis of Er Implanted LT-GaAs"), 3) Lutz et al. ("Electrical Properties and Thermal Stability of Be-Doped Non-stoichiometric GaAs"), 4) Spect et al. ("Defect Control in As-Rich GaAs"), 5) Bert et al. ("Enhanced arsenic excess in low-temperature grown GaAs due to indium doping"), or 6) Chaldyshev et al. ("Effect of isovalent indium doping on excess arsenic in gallium arsenide grown by molecular-beam epitaxy at low temperatures").

In view of the claim scope ambiguity addressed by the rejections under 35 USC 112 above, any of the six cited references anticipate the claims as originally filed:

Each of the six references disclose Be doping of LT-GaAs, with Be concentration less than antisite defect concentration, which anticipates the pending claims in view of the ambiguity:

Regarding the preambles to claims 1 and 6, the limitation of "controlling" is interpreted as being synonymous with "affecting" [see MPEP 2111.02].

Regarding claims 1 and 6, all the references disclose a method of “introducing acceptors” (i.e. Be), wherein “Be” inherently meets the “energy level” limitation (e.g. see claim 4).

The “controlling” of the preambles (i.e. affecting) is inherent when Be acceptors are introduced into LT-GaAs [e.g. see the Bert et al. or Chaldyshev et al. references, which both indicate experiments showing doping with shallow Be acceptors causes excess arsenic to decrease, such as at p. 3148 left column, second paragraph of Bert et al. or p. 693-694 of Chaldyshev et al.].

Regarding claims 2, 7, 12, 16 and 17, the acceptors (i.e. the “Be”) are “balanced” with the “antisite defects,” (i.e. defects from “excess arsenic”) because the “Be” is at a concentration that is “a concentration up to (but not exceeding) the concentration of antisites” [agreeing with the specification at p. 15, lines 22-24].

Regarding claims 3, 8, 13 and 18, LT-GaAs is a “III-V compound.”

Regarding claims 4, 9, 14 and 19, the shallow acceptor is “Be.”

Regarding claims 5, 10, 15 and 20, the (shallow) acceptors are “Be” and these acceptors are introduced into “LT-GaAs.”

Regarding claim 11, all of the references disclose “a material” comprising: a “compound semiconductor” (i.e. LT-GaAs) having “antisite defects therein” (from excess arsenic substituting for Ga in what would be an otherwise perfect GaAs crystal); and acceptor atoms (i.e. “Beryllium, Be”), the “Be” inherently meeting the “energy level” level limitation (inherent as evidenced by claim 14).

Art Unit: 2826

Regarding claim 21, all the references disclose LT-GaAs:Be, which is inherently "thermally stable" because the "Be" gives "increased thermal stability" (e.g. see abstract of Lutz et al., in "Electrical Properties and Thermal Stability of Be-doped Non-stoichiometric GaAs").

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 571-272-1969. The examiner can normally be reached on M-F (7:30AM-3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ETP
March 30, 2005


EVAN PERT
PRIMARY EXAMINER